Stainless steel micro needle for retinal vein cannulation.

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Purpose:

The current management of retinal vein occlusion consists mainly of treating its complications instead of the cause. Although successful blood clot removal via retinal vein cannulation using glass micropipettes has been reported, such glass design is fragile and implicates significant restrictions in shape. Therefore, a dedicated stainless steel micro needle was developed for retinal vein cannulation.

Methods:

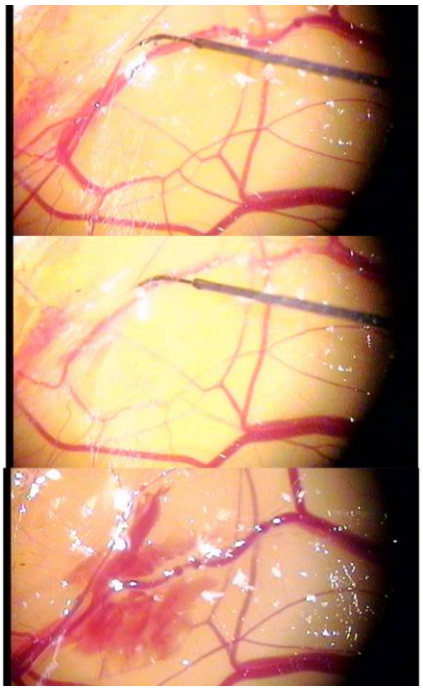
A stainless steel 45° angled micro needle with an outer diameter of 80 µm (approximately 44 Gauge) and a lumen of 35µm was developed. Using perfused chorio-allantoic membrane vessels of fertilized chicken eggs (aged 11 days) this needle was evaluated for puncture and infusion capability proven by visual confirmation of blood washout and bleeding after needle retraction.

Results:

Out of 25 freehanded cannulation attempts, 20 punctures were successfully executed by a junior vitreoretinal surgeon with visual confirmation of blood washout and bleeding after needle retraction. Vessel diameter ranged from 100µm to 250µm. There were no double punctures noted although in one vessel a slit-like injury to its wall was observed. Failure of puncture was related to difficult freehanded alignment and rolling of the vessels. All vessels were cannulated with the same needle that showed no signs of wearing. Perfusion pressures below 30 psi rendered stable infusion flow throughout the experiments.

Conclusions:

Micro vessel puncture and infusion of liquid is possible with this custom-built stainless steel 44 Gauge needle.



CAM vessel cannulation 1) TOP: vessel puncture; 2) MID: blood washout;3) BOTTOM: Bleeding after needle retraction